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| 10/649,636 | 08/28/2003 | Satoshi Fukuda | 520.43064X00 | 5550 |

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| EXAMINER | |
|---|---|
| DAYE, CHELCIE L | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2161 | |

DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/649,636 | FUKUDA ET AL. | |
| | Examiner | Art Unit | |
| | Chelcie Daye | 2161 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/8/04 & 7/1/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. This action is issued in response to Application filed August 28, 2003.

2. Claims 1-20 are pending.

### *Priority*

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Information Disclosure Statement*

*4.* The information disclosure statement (IDS) submitted on 11/18/2004 and 7/1/2005 were filed after the mailing date of the application on August 28, 2003. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### *Specification*

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Volume Allocation within a Storage Management System.

### *Claim Rejections - 35 USC § 112*

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter "performance value" and "specification value", which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Examiner is unsure if the performance value included in the history information is the same performance value included within the specification values. If the performance values are the same, examiner is then unclear of what makes the history information different from the specification information. However, if the performance values are not the same, it should be clearly specified along with disclosing the differences between the two. In order to further prosecution, examiner interprets the performance values to be one and the same, and interpret the history and specification values as being interchangeable.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**9. Claims 1 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Dalal (US Patent Application No. 20040120225) published June 24, 2004.**

Regarding Claim 1, Dalal discloses a volume allocating method in a storage management system for managing operation of a storage device connected via a network by use of a storage management server, the volume allocating method comprising:

receiving, via the network (Fig.10, item 1019, Dalal), a condition for allocating a volume designated by a client ([0086], lines 2-19,Dalal)[1];

obtaining information on operation history of the volume from a memory device for storing (Fig.12, "History"; [0087], lines 1-7, Dalal), as history, information including a performance value of a disk group obtained upon actually operating the storage device ([0101], lines 10-21, Dalal);

obtaining information on specification values including the performance value of the storage device ([0114], lines 7-11, Dalal);

assuring a performance margin ([0138], lines 1-12, Dalal)[2] and determining a candidate of an allocable volume ([0088], lines 1-7, Dalal) in accordance with the received condition for allocating the volume ([0086], lines 2-

[1] Examiner Notes: "Requirements" correspond to condition and "Obtaining from a user" corresponds to receiving by a client.
[2] Examiner Notes: "Performance parameter" corresponds to performance margin.

19,Dalal) based on the information on the operation history of the volume and the information on the storage device ([0101], lines 10-21, Dalal);

transmitting information on the volume of the allocated candidate to the client ([0105], lines 1-3, Dalal);

receiving information on volume allocation selected and transmitted from the information on the volume of the allocated candidate in the client ([0105], lines 3-7 and [0114], lines 15-22, Dalal); and

allocating the volume to the storage device in accordance with the information on the volume allocation ([0202], lines 1-6, Dalal).

Regarding Claim 18, Dalal discloses a volume allocating method further comprising:

displaying information including at least the performance value and reliability corresponding to the policy (Figs.15 and 22, Dalal), an index for selecting a memory capacity (Fig.19; [0142], lines 1-8, Dalal), and an index for selecting the policy on the display screen of the client so as to designate the condition for allocating the volume by the client (Fig.16; [0139], lines 1-11, Dalal).

### *Claim Rejections - 35 USC § 103*

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**11. Claims 2,3,10,19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalal (US Patent Application No. 20040120225) filed December 20, 2002 in view of Murotani (US Patent No. 6,779,078) filed February 23, 2001, and further in view of Leung (US Patent Application No. 20040054656) filed August 27, 2003.**

Regarding Claim 2, Dalal discloses a volume allocating method further comprising:

storing previously, in the memory device, a plurality of policies (Fig.11, item 1106, Dalal) one of which is selected by designating the condition for allocating the volume in the client (Fig.11; [0111], lines 7-14 and [0114], lines 3-22, Dalal). However, Dalal is silent with respect to the policy including information on at least an operating time zone. On the other hand, Murotani discloses information on at least an operating time zone (column 7, lines 1-13, Murotani). Dalal and Murotani are analogous art because they are from the same field of endeavor of storage allocation requirements. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Murotani's teachings into the Dalal system. A skilled artisan would have been motivated to do so as suggested by Murotani at column 6, lines 48-59, in order to show low access activity to the corresponding volumes, based on the time analysis. As a result, allowing the system to be aware of the different peak times worldwide. Dalal in view of Murotani, disclose all of the claimed subject matter. However,

Dalal in view of Murotani, are silent with respect to storing in the memory device, information on a forecasted performance value per unit time which is calculated from a capacity, a theoretical performance value, and information on the operation history of the volume of the disk group as an allocation target. On the other hand, Leung disclose storing in the memory device, information on a forecasted performance value per unit time which is calculated from a capacity ([0141], lines 1-4, Leung)[3], a theoretical performance value, and information on the operation history of the volume of the disk group as an allocation target ([0142-0143], lines 1-5 and 1-18, Leung)[4]. The combination of Dalal in view of Murotani, and further in view of Leung, are analogous art because they are from the same field of endeavor of management of storage environments. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Leung's teachings into the Dalal in view of Murotani system. A skilled artisan would have been motivated to do so as suggested by Leung at paragraph [0112], lines 1-12, in order to provide techniques for balancing capacity and directly proportion the availability of the storage unit. As a result, allowing the system to move data from one storage-unit to another with ease and efficiency.

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[3] Examiner Notes: Bandwidth corresponds to capacity.

[4] Examiner Notes: Due to the 112 rejection, as stated above, examiner is also unclear of the differences between theoretical performance value and forecasted performance value. The term 'theoretical' means either theory or hypothesis, while the term 'forecasted' means to estimate or predict, which seem to be analogous. As a result, examiner interprets the theoretical performance value to be represented by the expected availability and the forecasted performance value to be represented by the (desired threshold – current usage).

Regarding Claim 3, the combination of Dalal in view of Murotani, and further in view of Leung, disclose a volume allocating method wherein the step of determining the volume candidate comprises:

obtaining the performance margin ([0119], lines 6-14, Dalal) based on the theoretical performance value and the forecasted performance value per unit time of the volume included in the disk group ([0142-0143], lines 1-5 and 1-18, Leung);

calculating and subtracting the performance value designated by the policy from the obtained performance margin ([0141], lines 1-4, Leung); and

determining, as the allocation candidate, the volume of the disk group when the obtained value is positive as a result of the calculation ([0147], lines 1-13, Leung).

Regarding Claim 10, the combination of Dalal in view of Murotani, and further in view of Leung, disclose a volume allocating method further comprising, in the storage management server:

previously storing, in a memory device, a plurality of policies (Fig.11, item 1106, Dalal) including information on at least the performance value and the operating time zone (column 7, lines 1-13, Murotani); and

previously storing, in the memory device, information on the forecasted performance value per unit time calculated from information on the operation history of the capacity, theoretical performance value, and volume of the disk

group as the allocation target ([0142-0143], lines 1-5 and 1-18, respectively, Leung), and

the volume allocating method further comprising, in the client:

displaying, on a display screen of the client (Fig.31, item 3124, Dalal), information on the plurality of policies transmitted from the storage management server ([0116], lines 1-8, Dalal); and

selecting one policy by use of input means of the client, from the plurality of policies displayed on the display screen ([0038], lines 1-9 and [0144], lines 2-7, Leung), and

the volume allocating method further comprising:

displaying, on the display screen (Fig.31, item 3124, Dalal), volume information of the received allocated candidate ([0088], lines 1-7, Dalal);

selecting and designating one of allocated candidates displayed on the display screen ([0148], lines 7-15, Leung);

and transmitting, to the storage management server, information on the designated allocated candidate ([0105], lines 1-3, Dalal).

Regarding Claim 19, the combination of Dalal in view of Murotani, and further in view of Leung, disclose a volume allocating method in a storage management system, comprising:

receiving a condition on requested performance per operating time zone of a volume designated by a client (column 7, lines 1-13, Murotani);

referring to history information obtained from a result of actually operating disk groups (Fig.12, "History", [0087], lines 1-7, Dalal);

calculating a performance margin of the disk group upon allocating the volumes of the disk groups based on the history information ([0119], lines 6-14, Dalal),

obtaining a volume candidate as an allocation target from the disk groups ([0088], lines 1-7, Dalal) in accordance with a calculation result and presenting the volume candidate to the client ([0147], lines 1-13, Leung); and

receiving and storing one volume candidate selected by the client ([0148], lines 7-15, Leung).

Regarding Claim 20, the combination of Dalal in view of Murotani, and further in view of Leung, disclose a volume allocating method in a storage management system further comprising the step of:

displaying the volume candidate as the allocation target ([0088], lines 1-7, Dalal) on a display screen of the client (Fig.31, item 3124, Dalal) and selecting one volume candidate of the displayed contents ([0148], lines 7-15, Leung).

**12. Claims 4-9 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalal (US Patent Application No. 20040120225) filed December 20, 2002 in view of Leung (US Patent Application No. 20040054656) filed August 27, 2003.**

Regarding Claim 4, Dalal discloses a storage management server for managing the operation of a storage device connected via a network, the storage management server comprising:

a database for operation history (Fig.12, Dalal), which stores, as history, information including a performance value of a disk group obtained upon operating the storage device ([0101], lines 10-21, Dalal);

a database for a volume performance value (Fig.11, item 1004, Dalal) which stores information on specification values including performance, reliability, and a capacity of the storage device obtained from the storage device ([0180], lines 3-16, Dalal); and

a policy database (Fig.11, item 1006, Dalal) which stores information on policies including the performance corresponding to a plurality of set policies ([0114], lines 3-22, Dalal). However Dalal is silent with respect to a first processing means, which calculate a forecasted performance value from the information on the performance value of the disk group stored in the database for operation history ([0142-0143], lines 1-5 and 1-18, Leung); second processing means which obtain a performance margin ([0119], lines 6-14, Dalal), based on a theoretical performance value of the volume and the forecasted performance value obtained by the first processing means ([0142-0143], lines 1-5 and 1-18, Leung); and a calculation result of the second processing means ([0147], lines 1-13, Leung). On the other hand, Leung discloses a first processing means, which calculate a forecasted performance value from the information on the

performance value of the disk group stored in the database for operation history ([0142-0143], lines 1-5 and 1-18, Leung); second processing means which obtain a performance margin ([0119], lines 6-14, Dalal), based on a theoretical performance value of the volume and the forecasted performance value obtained by the first processing means ([0142-0143], lines 1-5 and 1-18, Leung); and a calculation result of the second processing means ([0147], lines 1-13, Leung). Dalal and Leung are analogous art because they are from the same field of endeavor of management of storage environments. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Leung's teachings into the Dalal system. A skilled artisan would have been motivated to do so in order to create higher available capacity, which is ultimately inversely proportional to the cost of storing data (i.e. lower storage costs).

Regarding Claim 5, the combination of Dalal in view of Leung, disclose a storage management server wherein the first processing means calculate the forecasted performance value per unit time based on information on the performance value obtained from the database for operation history ([0142-0143], lines 1-5 and 1-18, Leung), and

the database for a volume performance value stores information on the forecasted performance value per unit time obtained by the first processing means, corresponding to the disk group (Fig.11, item 1004, Dalal).

Regarding Claim 6, the combination of Dalal in view of Leung, disclose a storage management server wherein the second processing means perform processing for obtaining a difference between the performance margin per unit time and a designated performance value stored in the policy database ([0141], lines 1-4, Leung), and

the volume determination processing means determine ([0106], lines 1-3, Dalal), as the allocation candidate, the volume which is obtained by the second processing means and has a positive difference ([0147], lines 1-13, Leung).

Regarding Claim 7, the combination of Dalal in view of Leung, disclose a storage management server further comprising:

means which transmit information indicating a volume candidate determined by the volume determination processing means ([0105], lines 1-3, Dalal) so as to display the information on a client connected to the storage management server (Fig.31, item 3124, Dalal); and

means which receive the information on the volume allocation selected by the client in accordance with the displayed information ([0114], lines 15-22, Dalal).

Regarding Claim 8, the combination of Dalal in view of Leung, disclose a system having a storage management server wherein the storage management

server has a client connected thereto via the network, and wherein the client comprises:

means which designate and inputting a condition for allocating the volume ([0086], lines 2-19, Dalal);

display means (Fig.31, item 3124, Dalal) which display information indicating the volume candidate ([0088], lines 1-7, Dalal) determined by the volume determination processing means ([0106], lines 1-3, Dalal); and

means which transmit, to the storage management server, the information on the volume allocation selected from the volume information of the allocation candidate displayed on display means ([0105], lines 1-3, Dalal).

Regarding Claim 9, the combination of Dalal in view of Leung, disclose a program for selecting and generating a volume candidate functioning on a storage management server, the storage management server comprising a database on operation history for storing, as history, information including a performance value of a disk group obtained by operating a storage device connected via a network, a database for a volume performance value for storing information on specification values including performance, reliability, and a capacity of the storage device, obtained from the storage device, and a policy database for storing information on a policy including the performance corresponding to a plurality of set policies, the program for generating the volume candidate comprising:

a first processing step of calculating a forecasted performance value from the information on the performance value of the disk group stored in the database on the operation history ([0142-0143], lines 1-5 and 1-18, Leung);

a second processing step of obtaining a performance margin ([0119], lines 6-14, Dalal) based on a theoretical performance value of the volume and the forecasted performance value obtained in the first processing step ([0142-0143], lines 1-5 and 1-18, Leung);

a volume determination processing ([0106], lines 1-3, Dalal) step of determining a candidate for allocating the volume in accordance with a calculation result of the second processing step ([0147], lines 1-13, Leung); and

a step of generating information for displaying a volume candidate from information based on the volume determination processing step ([0116], lines 1-8, Dalal), so as to display the volume candidate on a client connected to the storage management server (Fig.31, item 3124, Dalal).

Regarding Claim 11, the combination of Dalal in view of Leung, disclose a storage management server for managing operation of a storage device connected via a network, comprising:

a database for operation history (Fig.12, Dalal), which stores, as history, information including a performance value of a disk group obtained upon operating the storage device ([0101], lines 10-21, Dalal);

a database for a volume performance value (Fig.11, item 1004, Dalal) which stores information on specification values including a performance on the storage device ([0180], lines 3-16, Dalal);

processing means which calculate a forecasted performance value from the information on the performance value of the disk group stored in the database for operation history ([0142-0143], lines 1-5 and 1-18, Leung) and which obtains a performance margin per unit time ([0119], lines 6-14, Dalal) based on the obtained forecasted performance value and a theoretical performance value stored in the database for a volume performance value ([0142-0143], lines 1-5 and 1-18, Leung);

volume determination processing means ([0106], lines 1-3, Dalal) which determine a candidate for allocating a volume in accordance with a calculation result of the processing means ([0147], lines 1-13, Leung); and

means for transmitting, to a client connected to the storage management server, information indicating a volume candidate determined by the volume determination processing means ([0105], lines 1-3, Dalal).

Regarding Claim 12, the combination of Dalal in view of Leung, disclose a storage management server further comprising:

a policy database (Fig.11, item 1006, Dalal) which stores information on a policy including the performance corresponding to a plurality of set policies ([0114], lines 3-22, Dalal).

Regarding Claim 13, the combination of Dalal in view of Leung, disclose a storage management server wherein the database for a volume performance value stores a disk group name (Fig.17, Dalal), reliability, a capacity ([0141], lines 1-4, Leung), a theoretical performance value, and the forecasted performance value corresponding to the set disk group ([0142-0143], lines 1-5 and 1-18, Leung).

Regarding Claim 14, the combination of Dalal in view of Leung, disclose a storage management server wherein the database for operation history stores a disk group name (Fig.17, Dalal) and an actual estimated performance value corresponding to the set disk group ([0142-0143], lines 1-5 and 1-18, Leung).

Regarding Claim 15, the combination of Dalal in view of Leung, disclose a storage management server according to claim 12, wherein the processing means comprises:

first processing means which obtain the unit time from the designated policy (Fig.11; [0111], lines 7-14 and [0114], lines 3-22, Dalal) and which segment the history information stored in the database on the operation history per unit time ([0142-0143], lines 1-5 and 1-18, Leung);

second processing means which obtain an average of the segmented data ([0119], lines 6-14, Dalal) and which obtain the forecasted performance value ([0142-0143], lines 1-5 and 1-18, Leung);

third processing means which obtain the performance margin by subtracting the forecasted performance value from the theoretical performance value per unit time and which subtract the performance value designated by the policy from the performance margin per short time ([0141], lines 1-4, Leung); and

fourth processing means, which determine whether or not the subtracted value is positive and which determine the volume of the target disk group if the subtracted value is positive ([0147], lines 1-13, Leung).

Regarding Claim 16, the combination of Dalal in view of Leung, disclose a storage management server according to claim 11, wherein the client comprises:

means which receive information for allocating the volume selected from the received volume candidates by the client ([0114], lines 15-22, Dalal); and

means which transmit, to the storage device, the information for allocating the volume received by the receiving means so as to allocate the volume of the storage device ([0105], lines 1-3, Dalal).

Regarding Claim 17, the combination of Dalal in view of Leung, disclose a system wherein the display means of the client displays the information indicating

a name (Fig.17, Dalal), performance (Fig.15, Dalal), and reliability (Fig.15, Dalal) of the disk group as the volume candidate.

***Points of Contact***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chelcie Daye whose telephone number is 571-272-3891. The examiner can normally be reached on M-F, 7:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JEFFREY GAFFIN
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Chelcie Daye
Patent Examiner
Technology Center 2100
April 28, 2006

SA